coating positioned to receive electrons emitted by the current emitter,

B4 cont. said current emitter comprising a plasma enhanced chemical vapor deposition hydrogenation process-treated and subsequently nitrogen infusion process-treated current emission surface having a reduced concentration of native oxides.

25. (New) The device according to claim 24, wherein said treated current emission surface has a reduced atomic concentration of oxygen and silicon.

REMARKS

Reconsideration and allowance of this application, as amended, are respectfully requested. Claims 12, 15, and 18 have been amended, and new claims 24 and 25 have been added. Claims 12-25 are now pending in the application. The objection and rejections are respectfully submitted to be obviated in view of the amendments and remarks presented herein.

Claim 15 has been editorially amended as required by the Office Action. Claim 12 has been editorially amended to even more specifically define an important structural feature of the claimed current emitter, i.e., a "treated current emission surface having a reduced atomic concentration of oxygen." Claim 18 has been editorially amended for improved readability. Entry of each of the amendments is respectfully requested.

35 U.S.C. § 102(e) – Sandhu

Claims 12 and 18-23 stand rejected under 35 U.S.C. § 102(e) as allegedly being anticipated by U.S. Patent No. 6,086,442 to Sandhu et al. (hereinafter "Sandhu"). The Office Action asserts, *inter alia*, that Sandhu discloses "a field emission display as claimed," and relies upon "Fig. 3, and respective portions of the specification." With respect to claim 12, the Office Action asserts that "Sandhu discloses a field emission display including an emitter 48 formed of a doped silicon (see col. 2, lines 19-23), a substrate 60 having a phosphor coating 62, said emitter having a current emission surface (layer 56) that has been treated with a plasma enhanced CVD hydrogenation process (see col. 2, lines 39-55) followed by a nitrogen infusion process (see col. 3, lines 8-11)."

Applicant respectfully disagrees. The disclosure of Sandhu does not anticipate Applicant's claimed invention because it fails to disclose, *inter alia*, the claimed "current emitter comprising a *treated current emission surface having a reduced atomic concentration of oxygen* resulting from treatment of the current emission surface with a plasma enhanced chemical vapor deposition *hydrogenation* process followed by a nitrogen infusion process (emphasis added)." As disclosed at specification page 3, lines 7-16, the structure of Applicant's treated current emission surface provides for increased current emission:

> In the invention an amorphous silicon tip doped with boron or phosphorus is subjected to *PECVD hydrogenation followed by an infusing nitrogen plasma*, preferably a NH_3 plasma, which deposits onto the tip surface, while the FED structure is still in the PECVD

> chamber. *PECVD hydrogenation removes oxides from the silicon surface by infusing hydrogen. The result is the tip being free of approximately one third of the native oxides, which formed when the tip was exposed to atmospheric conditions and which would have otherwise remained on the tip yielding a less than desirable emission current.* The nitrogen plasma treatment is used to complete the process (emphasis added).

For at least the following reasons, Applicant's claimed device is structurally different from the device disclosed by Sandhu. First, contrary to the assertion in the Office Action, Sandhu does not disclose "a current emission surface (layer 56) that has been treated with a plasma enhanced CVD hydrogenation process (see col. 2, lines 39-55) followed by a nitrogen infusion process (see col. 3, lines 8-11)." More specifically, with respect to the plasma enhanced CVD hydrogenation process limitation, the Office Action relies upon Sandhu's disclosure at col. 2, lines 39-55. At col. 2, lines 39-55, however, Sandhu discloses the use of plasma enhanced chemical vapor deposition for depositing an electrically conductive layer 56, not for treating a current emission surface, as claimed. That is, at col. 2, lines 39-43, Sandhu discloses the following:

> The preferred method of substantial selectively depositing is by chemical vapor deposition (CVD), which includes plasma enhanced chemical vapor deposition (PECVD) and low pressure chemical vapor deposition (LPCVD).

But, the above-quoted disclosure is part of the paragraph comprising col. 2, lines 30-51, and the first sentence of the paragraph discloses that "[r]eferring to FIG. 2, an electrically

conductive layer 52[1] is substantially selectively deposited over grid 52 and emitters 48 relative to insulative mass 50." Thus, in the disclosure relied upon by the Office Action, Sandhu teaches an electrically conductive layer 56 (see Sandhu Fig. 2) deposited by plasma enhanced chemical vapor deposition. There is no teaching whatsoever in Sandhu of Applicant's claimed structure, i.e., *a treated current emission surface* resulting from treatment with a plasma enhanced chemical vapor deposition *hydrogenation* process, let alone the claimed "treated current emission surface *having a reduced atomic concentration of oxygen.*" Thus, by virtue of this distinction alone, Sandhu does not anticipate the claimed invention.

Secondly, with respect to the nitrogen infusion process limitation, the Office Action relies upon Sandhu's disclosure at col. 3, lines 8-11. At col. 3, lines 8-11, however, Sandhu discloses the use of nitrogen infusion for nitridizing "metal layer 56" (i.e., the metal layer deposited by Sandhu's PECVD process, as described above), not for treating a current emission surface that has been previously treated with a plasma enhanced chemical vapor deposition *hydrogenation* process, as claimed. Thus, there is no teaching in Sandhu of Applicant's claimed structure, i.e., *a treated current emission surface* resulting from nitrogen infusion treatment after a plasma enhanced chemical vapor deposition *hydrogenation* treatment, let alone the claimed "treated current emission surface *having a reduced atomic concentration of oxygen.*"

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[1] Applicant's representative presumes that Sandhu's disclosure of "an electrically conductive layer 52" should read "an electrically conductive layer 56."

Sandhu does not, therefore, anticipate the invention defined by Applicant's claim 12. Claims 18-23 are allowable along with claim 12, and on their own merits.

For at least the above reasons, reconsideration and withdrawal of the rejection of claims 12 and 18-23 under § 102(e) are respectfully requested.

35 U.S.C. § 103(a) – Sandhu in view of Kanicki

Claims 13-17 stand rejected under 35 U.S.C. § 103(a) as allegedly being unpatentable over Sandhu in view of Kanicki. The Office Action relies upon Kanicki for the teaching of "a barrier film (see page 119) on a glass substrate [that] improves chemical durability."

For all of the reasons identified above with respect to the rejection over Sandhu under § 102(e), the rejection under § 103(a) is similarly traversed. Each of claims 13-17 depends from an independent claim that is allowable for the reasons discussed above. Kanicki adds nothing to rectify the above-described deficiencies associated with Sandhu.

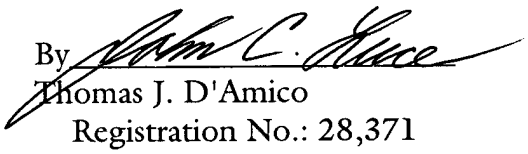
Furthermore, under the provisions of 35 U.S.C. § 103(c), the asserted combination of references is improper. Since the subject matter disclosed in Sandhu (which qualifies as prior art only under § 102(e)) and the subject matter of the claimed invention were commonly owned at the time the invention was made, the Sandhu reference is not to be considered in a determination of patentability under § 103.

Reconsideration and withdrawal of the rejection of claims 13-17 under § 103(a) are respectfully requested.

In view of the above, each of the presently pending claims in this application is believed to be in immediate condition for allowance. Accordingly, the Examiner is respectfully requested to withdraw the outstanding rejection of the claims and to pass this application to issue.

Dated: January 30, 2003

Respectfully submitted,

By 

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Version With Markings to Show Changes Made

In the Claims

Claims 12, 15, and 18 have been amended as follows:

12. (Amended) A field emission display device comprising:

at least one current emitter formed of a doped silicon; and

a substrate having a phosphor coating [therein,] in [or] at least one region positioned to receive [elections] electrons emitted by said current emitter[; and],

said current emitter [having] comprising a treated current emission surface having a reduced atomic concentration of oxygen [which has been treated] resulting from treatment of the current emission surface with a plasma enhanced chemical vapor deposition hydrogenation process followed by a nitrogen infusion process[, which reduces the concentration of oxygen at said current emission surface].

15. (Amended) The device according to claim 13, wherein said current emitter has a base on said barrier layer and a projecting top connected with said base[;].

18. (Amended) The device according to claim 12, wherein said current emitter comprises sides and a tip, said sides [is] being surrounded [on the sides] by [a] an insulating layer [such that] to prevent current [may not radiate] from radiating out of [said] the sides [of said current emitter, where] , wherein said sides do not include any portion of the tip [of said current emitter].